

EFFECTS OF LYSERGIC ACID DIETHYLAMIDE ON THE
MATERNAL BEHAVIOR OF THE RAT*¹

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A. INTRODUCTION

Goodman *et al.* (2) reported that hamsters with hippocampal lesions were deficient in the care of their litters. Thus, it seemed that the hippocampal system participated in the organization of maternal behavior. The disruption of the hippocampal system by an injection of lysergic acid diethylamide (LSD-25), a potent hallucinogen, was demonstrated by Evarts and Marshall (1). The results of the two experiments provided the basis for the following hypothesis: An administration of LSD-25 to female rats will disrupt their maternal behavior. The present experiment on nursing behavior was conducted to test the hypothesis.

B. METHOD

Twenty-five matured female rats of the Wistar strain were mated with healthy males. At parturition, twenty females that bore ten or more offspring each were selected for the drug study. Each mother was allowed to nurse ten offspring. All other offspring were discarded. Six days after parturition, each mother and its ten offspring were housed in a test cage. Each cage (42 × 26 × 18 cm) was divided into three compartments by two partitions, one of them erected ten cm from the left end of the cage and the other located ten cm from the right end. Each partition had a doorway, allowing an animal to crawl from one compartment to the next one. One of the end compartments was considered to be a nesting place, while the other one at the opposite end was used as a confining chamber.

Nine days after parturition, the mothers were housed in the confining chambers during the night. In the morning they were given a pretest to measure their nursing behavior. The pretest was initiated by opening the partition doors and allowing the mothers to go to the nesting compartments to nurse their off-

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spring. The starting time of the test and that of the nursing, and the duration of nursing were recorded. They were allowed to nurse until they attained the criterion of 15 minutes of continuous nursing. For each mother, the time taken to attain the criterion was noted. According to their time scores, they were matched and assigned equally to experimental and control groups. Experimental mothers were injected intraperitoneally with .2 mg/kg of LSD-25, whereas the control mothers were given .9% saline solution. A standard volume of one ml/kg of LSD-25-saline solution or that of saline solution alone was injected to each experimental or control animal, respectively. Fifteen minutes after the injection they were given a nursing test. The test was begun by opening the partition doors and permitting the mothers to enter their nests and to nurse their pups. The duration of time they nursed during the three-hour test period was recorded.

C. RESULTS AND DISCUSSION

Most of the experimental animals entered the nursing compartments, sniffed their offspring, crept into the middle compartment, prostrated quietly, and writhed occasionally. On the other hand, all of the control animals began nursing within five minutes. Some of the treated animals began to nurse approximately an hour after the initiation of the test, but they did not continuously nurse them as most of the control animals did. One and a half hours after the initiation of the test, most of the experimental animals had started to nurse. The mean nursing time (79.3 minutes) of the experimental group was significantly shorter than that (153.0 minutes) of the control group ($t = 2.88$, $df = 18$, $p = < .001$), indicating that the hypothesis was tenable. Nine days after the test, the mean weight (34.3 gm) of the offspring of the experimental mothers was not significantly different from that (35.6 gm) of the offspring of the control mothers, indicating that the temporary disruption of nursing had no significant effect on the growth of the offspring.

The results, showing that the administration of LSD-25 prevented temporarily an ongoing nursing response, are consistent with those of the author's previous studies indicating that LSD-25 interrupted the orientation response of the rat in the underwater swim alley (5), inhibited the social dominance behavior in a food competition situation (4), and disrupted the visual size discrimination performance of the squirrel monkey tested in the Wisconsin General Test Apparatus(6).

D. SUMMARY

Nine days after parturition, 20 female rats of the Wistar strain were matched according to their nursing behavior and assigned to an experimental

and a control group. The experimental animals were injected intraperitoneally with .2 mg/kg of lysergic acid diethylamide, while the control animals were given .9% saline solution. Fifteen minutes after the injection, they were administered a nursing test and observed for three hours. Most of the experimental animals did not start nursing until 1½ hours after the initiation of the test, whereas all of the control animals began nursing within five minutes. The mean nursing time of the experimental group was significantly shorter than that of the control group, indicating that the administration of hallucinogenic compound disrupted the maternal behavior.

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